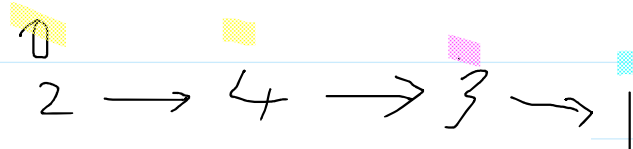


Recall: Permutation group.

13] Thrm (Cayley Theorem)

[13] Theorem. (Cayley Theorem) Every group is isomorphic to a subgroup of some permutation group.



14]

[14] Examples.

- (a) The additive group \mathbf{Z}_2 is isomorphic to the permutation group S_2 , with the trivial isomorphism mapping of $\theta(0) = [1\ 2]$ and $\theta(1) = [2\ 1]$.
- (b) The additive group \mathbf{Z}_3 is isomorphic to a subgroup of S_3 , with the isomorphism mapping of $\theta(0) = [1\ 2\ 3]$, $\theta(1) = [2\ 3\ 1]$, and $\theta(2) = [3\ 1\ 2]$.
- (c) The multiplicative group \mathbf{Z}_5^* is isomorphic to a subgroup of S_4 . Here, we notice that $\text{ord}(2) = 4$. So we need a permutation of order 4 to generate a subgroup of 4 elements. Taking the permutation $[2\ 3\ 4\ 1]$, we obtain a possible mapping as follows: $\theta(1) = [1\ 2\ 3\ 4]$, $\theta(2) = [2\ 3\ 4\ 1]$, $\theta(3) = [4\ 1\ 2\ 3]$, and $\theta(4) = [3\ 4\ 1\ 2]$.